REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested. Claims 1-4 and 7-19 and 37-43 are pending. Claims 1 and 7-10 are amended by way of the present amendment. As amended Claims 1 and 7-10 are supported by the original claims, no new matter is added.

In the outstanding Office Action, Claims 1-4, 6-19, and 37-43 were rejected as unpatentable over Bekiaris et al. (U.S. Patent Application Publication No. 20030119307, hereinafter "Bekiaris") in view of Sandhu et al. (U.S. Patent Application Publication No. 20050056940, hereinafter "Sandhu").

Initially, applicants and applicants' representatives thank Primary Examiner Warren for the interview held on March 22, 2006 to discuss the present case. During the interview, differences between the claimed invention and the cited references were discussed in detail, especially with regard to the assertions in the outstanding Office Action that the claimed subject matter is inherently described in the references. The Examiner agreed to reconsider the rejections of record after formal submission of the present amendment.

With regard to the rejection of Claim 1 as anticipated by Bekiaris, that rejection is respectfully traversed.

Amended Claim 1 recites in part, "said amorphous carbon layer having at least one optical property that substantially matches the corresponding optical property of said film stack, wherein said at least one optical property includes at least one of an index of refraction and an extinction coefficient."

Bekiaris describes a method of forming a dual damascene structure that includes a layer 124 that may be an organic amorphous carbon film.[1] However, there is no discussion in Bekiaris of the index of refraction or the extinction coefficient of the described layer, much

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[1] See Bekiaris, paragraph 39.

less that an index of refraction and/or an extinction coefficient of the described layer matches the corresponding optical property of any other part of the described structure. Thus, Bekiaris does not teach or suggest the above-recited feature of Claim 1.

Sandhu describes a masking structure that includes an amorphous carbon film 330.[2] Although Sandhu provides ranges for an absorption coefficient of layer 330,[3] Sandhu does not describe that the absorption coefficient of layer 330 matches the absorption coefficient of any other part of the described structure. Accordingly, Sandhu does not teach or suggest the above-recited feature of Claim 1 either.

The outstanding Office Action asserted with respect to Claim 6 that "the amorphous carbon layer of Bekiaris and Sandhu inherently has the optical property of an index of refraction and an extinction coefficient since the materials and structure are the same as the instant invention."[4] However, "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'" *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (citations omitted). In fact, "To establish inherency, the extrinsic evidence 'must make clear that the missing descriptive matter is *necessarily* present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill. *Inherency, however, may not be established by probabilities or possibilities.* The mere fact that a certain thing may result from a given set of circumstances is not sufficient.'" *In re Robertson*, 169 F.3d 743, 745, 49 USPQ2d 1949, 1950-51 (Fed. Cir. 1999) (Emphasis added.)

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[2]See Sandhu, paragraphs 15-17 and Figure 3.
[3]See Sandhu, paragraph 16.
[4]See the outstanding Office Action at page 4, lines 4-7.

In the present case, applicant agrees that the layers described in the cited references would inherently have some index of refraction and extinction coefficient, but no evidence of any kind has been provided to establish that "said amorphous carbon layer having at least one optical property that *substantially matches the corresponding optical property of said film stack*, wherein said at least one optical property includes at least one of an index of refraction and an extinction coefficient" is inherent in the disclosure of either <u>Bekiaris</u> and <u>Sandhu</u>. It is respectfully submitted that carbon layers, although made of the same material, may have different optical properties based on the molecular structure of the materials. Certainly graphite and diamond, both made of carbon, have significantly different optical properties. Thus, it is respectfully submitted that the amorphous carbon layers described in <u>Bekiaris</u> and <u>Sandhu</u> do not *necessarily* have at least one optical property that substantially matches the corresponding optical property of a film stack, wherein the at least one optical property includes at least one of an index of refraction and an extinction coefficient.

In the present case, as no extrinsic evidence has been provided to show that the amorphous carbon layers described in <u>Bekiaris</u> and/or <u>Sandhu</u> necessarily have at least one optical property that substantially matches the corresponding optical property of a film stack, wherein the at least one optical property includes at least one of an index of refraction and an extinction coefficient, amended Claim 1 is not inherently described by <u>Bekiaris</u> and <u>Sandhu</u>.

Accordingly, it is respectfully submitted that neither <u>Bekiaris</u> nor <u>Sandhu</u> teaches or suggests "said amorphous carbon layer having at least one optical property that substantially matches the corresponding optical property of said film stack, wherein said at least one optical property includes at least one of an index of refraction and an extinction coefficient," as recited in amended Claim 1.

Consequently, Claim 1 (and Claims 2-4 and 7-19 dependent therefrom) is patentable over <u>Bekiaris</u> in view of <u>Sandhu</u>.

Claim 37 recites in part, "said amorphous carbon layer is an anti-reflective layer."

The outstanding Office Action asserts that the above-recited element is inherently disclosed in <u>Sandhu</u>, "because the amorphous carbon layer is the same material as the instant invention and is transparent, it inherently is an anti-reflective layer."[5] However, as discussed above, a proper inherency rejection requires that the allegedly inherent subject matter be *necessarily* present in <u>Sandhu</u>. It is respectfully submitted that an anti-reflective layer is not determined by the material or the transparency of the layer alone. In a first type of antireflective layer the thickness and index of refraction of the layer with respect to the adjacent layers determines the antireflective properties. For example, The Photonics Dictionary defines an antireflection coating as "A thin layer of material applied to a lens surface to reduce the amount of reflected energy. Ideally the index of refraction of that material should be equal to the square root of the product of the indices of the material on either side of the coating, while the ideal thickness for a single-layer coating is one-quarter of the wavelength at which reflectance is to be minimized."[6] As <u>Sandhu</u> does not describe that the thickness and index of refraction of the layer 330 with respect to the adjacent layers is such that the layer 330 is an antireflective layer, there is no explicit or inherent teaching or suggestion in <u>Sandhu</u> that "said amorphous carbon layer is an anti-reflective layer" of the first type described above.

In a second type, the optical properties of the layer with respect to the adjacent layers, such as the index of refraction and the extinction coefficient, and the wavelength of incident light determine the antireflective properties based on absorption of the incident light by the layer. With respect to this type of antireflective layer, it is noted above with respect to Claim 1 that <u>Sandhu</u> does not describe the absorption coefficient or the index of refraction of layer 330 with respect to any other part of the described structure. Thus, it is respectfully

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[5]See the outstanding Office Action at page 3, lines 10-12.
[6]See <u>www.photonics.com/dictionary</u>, a copy of which is attached.
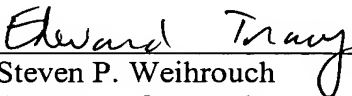
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submitted that there is no explicit or inherent teaching or suggestion in <u>Sandhu</u> that "said

amorphous carbon layer is an anti-reflective layer" of the second type described hereinabove.

Thus, as <u>Sandhu</u> does not describe in any way the thickness of the layer 330 or the

optical properties of the layer with respect to the other layers of the structure or the incident

wavelength, there is no explicit or inherent teaching or suggestion in <u>Sandhu</u> that "said

amorphous carbon layer is an anti-reflective layer." As neither <u>Sandhu</u> nor <u>Bekiaris</u> teaches

or suggests this feature, Claim 37 (and Claims 38-43 dependent therefrom) is patentable over

<u>Bekiaris</u> in view of <u>Sandhu</u>.

Consequently, in view of the present amendment and in light of the foregoing

comments, it is respectfully submitted that the invention defined by Claims 1-4, 7-19 and 37-

43 patentably distinguishes over the cited art. The present application is therefore believed to

be in condition for formal allowance and an early and favorable reconsideration of this

application is therefore respectfully requested.

Respectfully submitted,

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antireflection coating

Definition:

A thin layer of material applied to a lens surface to reduce the amount of reflected energy. Ideally the index of refraction of that material should be equal to the square root of the product of the indices of the material on either side of the coating, while the ideal thickness for a single-layer coating is one-quarter of the wavelength at which reflectance is to be minimized. See also multilayer coating.

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